

Chapter 1 Eukaryotic Cell Structure

Multiple Choice

1. What is the pH of a solution of 0.01M acetic acid, 1M Na acetate? (pKa of acetic acid = 4.75)
- a. 4.75
 - b. 5.75
 - c. 3.75
 - d. 6.75
 - e. 2.75

Ans: D

2. Which of the following is not true regarding water as a solvent?
- a. involves covalent interactions with the solute
 - b. water can dissolve uncharged polar molecules
 - c. hydrophilic substances readily dissolve in water
 - d. amphipathic substances have conflicting tendencies in water
 - e. water can dissolve ionic species

Ans: A

3. Which of the following statements regarding pH is not true?
- a. $\text{pH} = \log[\text{H}^+]$
 - b. a ten fold change in $[\text{H}^+]$ alters the pH by 1 unit
 - c. the pH of pure water is 7
 - d. many physiological reactions are sensitive to pH
 - e. in a buffer the pH changes little with addition of small amounts of strong acid or base

Ans: A

4. To make an acetate buffer at pH 3.7, what is the required ratio of sodium acetate to acetic acid? (pKa of acetic acid is 4.7)
- a. 100:1
 - b. 10:1
 - c. 1:1
 - d. 1:10
 - e. 1:1

Ans: D

5. What is the pH of a solution in which $[H^+] = 10 \times 10^{-9} \text{ M}$?

- a. 6
- b. 7
- c. 8
- d. 9
- e. 1

Ans: C

6. The enzymes responsible for the degradation of sphingolipids are localized in which subcellular structure?

- a. Peroxisomes
- b. Mitochondria
- c. Lysosomes
- d. Smooth endoplasmic reticulum
- e. Rough endoplasmic reticulum

Ans: C

7. Beta-glucuronidase is found in which subcellular fraction of the liver?

- a. Total microsomes
- b. Lysosomes
- c. Golgi apparatus
- d. Mitochondria
- e. Cytosol

Ans: B

8. Which of the following membrane systems are responsible for the bulk of cellular protein and lipid synthesis?

- a. Plasma membrane
- b. Microbodies
- c. Lysosomes
- d. Endoplasmic reticulum
- e. Golgi complex

Ans: D

9. The principal type of reaction carried out by lysosomal enzymes is

- a. phosphorylation.
- b. dehydration.
- c. dehydrogenation.
- d. hydroxylation.
- e. hydrolysis.

Ans: E

10. What is required for the formation of a hydrogen bond?

- a. A carboxyl group as acceptor
- b. A hydrogen attached to an electronegative atom
- c. A hydrogen in the proximity of a nitrogen atom
- d. A hydrogen that is a part of a double bond
- e. A hydrogen that is part of an aliphatic compound

Ans: B

11. What is the cause of I cell disease?

- a. Failure of targeting of enzymes to lysosomes
- b. Impermeability of lysosomal membranes
- c. Import of extracellular hydrolytic enzymes
- d. Lack of primary lysosomes
- e. Products of lysosomal hydrolysis accumulate in lysosomes

Ans: A

12. Peroxisomes produce much hydrogen peroxide. How are they protected from damage by this reactive oxygen species precursor?

- a. Catalase
- b. Glutathione peroxidase
- c. Rapid export from the peroxisome
- d. Rapid synthesis of new peroxisomes
- e. Superoxide dismutase

Ans: A

13. Which type of organelle is most likely to contain a set of enzymes devoted mainly to catabolism?

- a. rough endoplasmic reticulum
- b. smooth endoplasmic reticulum
- c. storage granule
- d. lysosome
- e. Golgi apparatus

Ans: D

14. What is the ratio of protonated to unprotonated lactic acid in a 0.1 M solution of lactic acid at pH 5.86? (pKa of lactic acid is 3.86)

- a. 1:100
- b. 1:10
- c. 1:1
- d. 10:1
- e. 1:1

Ans: A